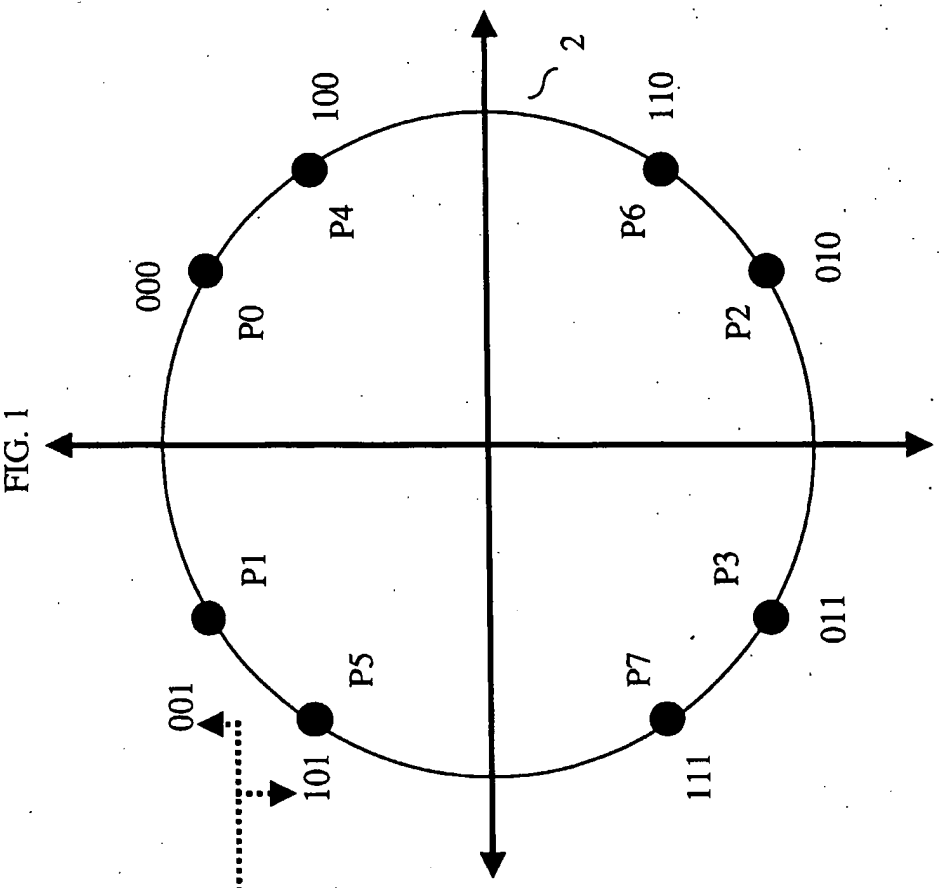


FIG. 1

Prior Art

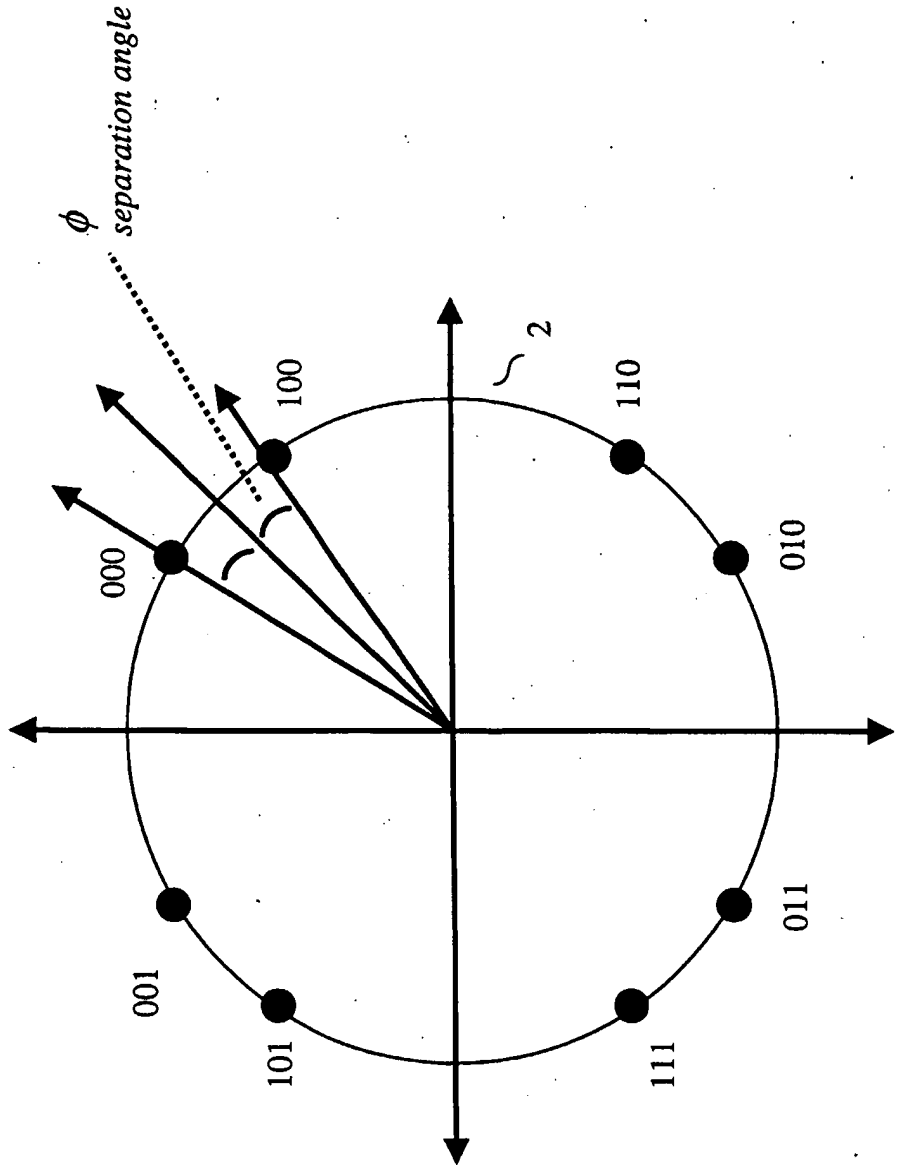


FIG. 2

Prior Art

100

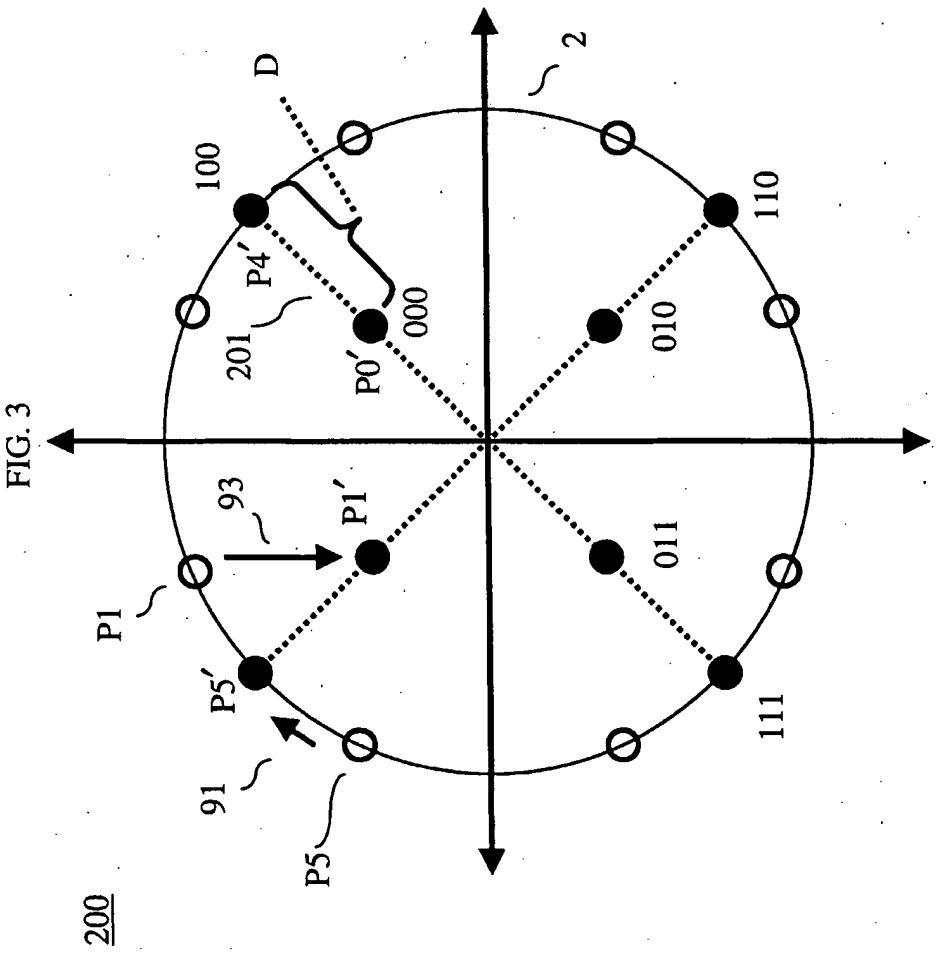


FIG. 3

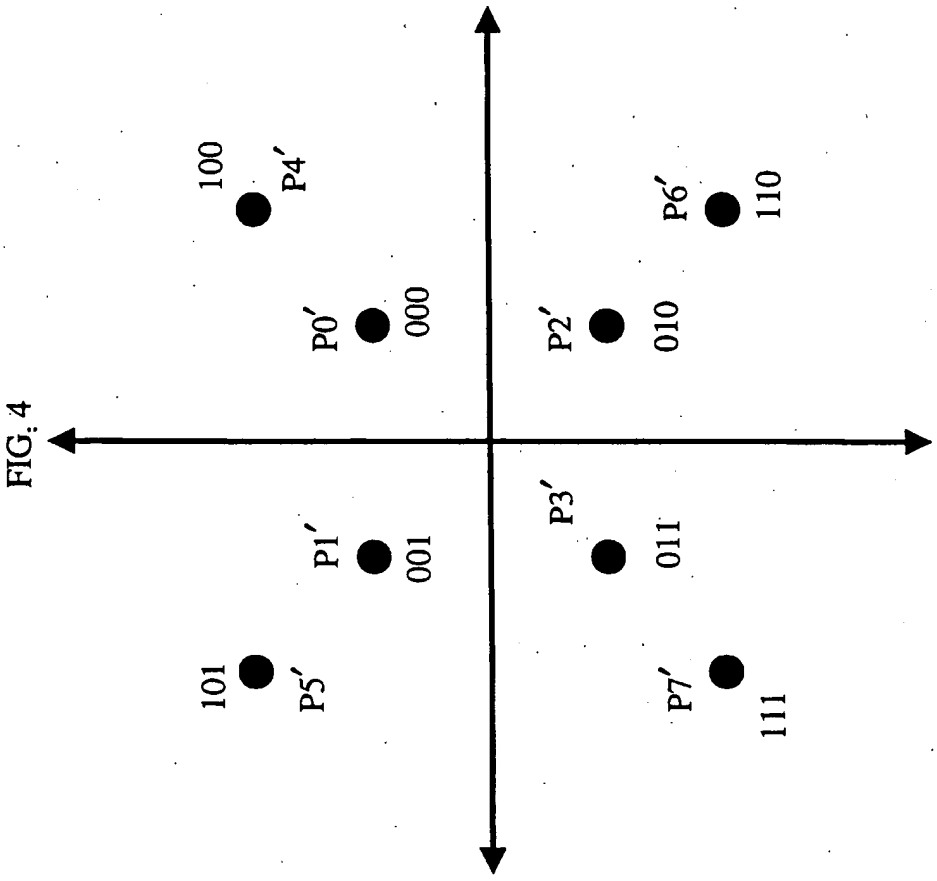


FIG. 4

FIG. 5

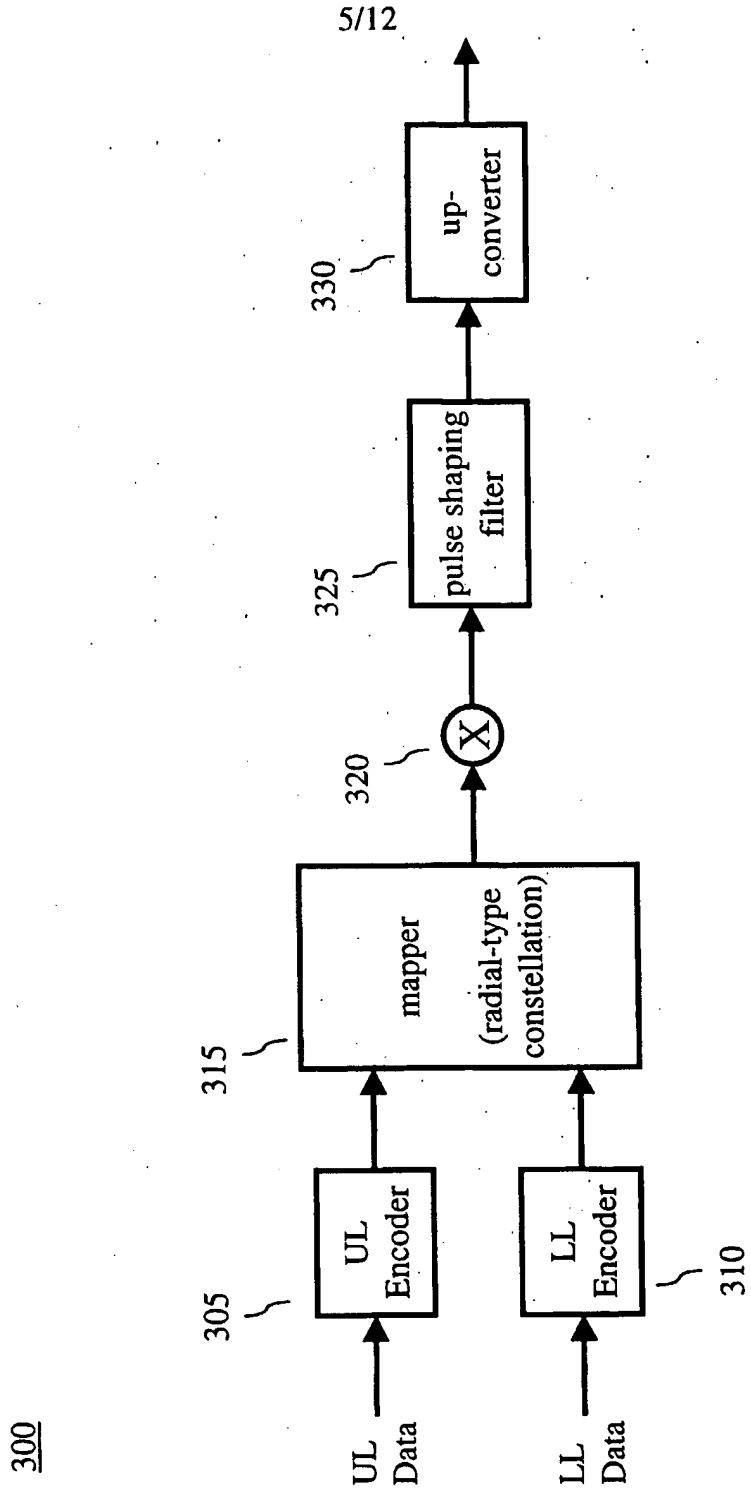

300
UL Data
LL Data
305
UL Encoder
310
LL Encoder
315
mapper (radial-type constellation)
320
X
325
pulse shaping filter
330
up-converter

FIG. 6

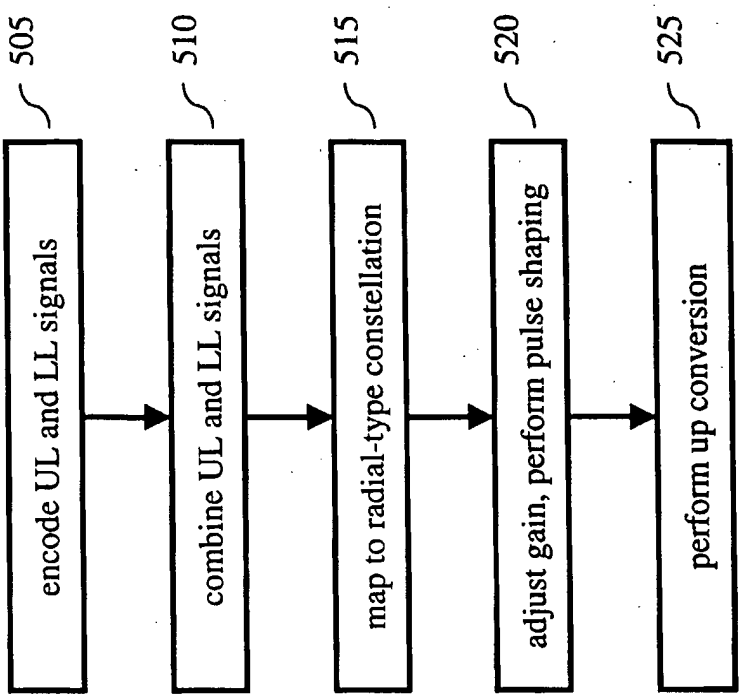

505
encode UL and LL signals
510
combine UL and LL signals
515
map to radial-type constellation
520
adjust gain, perform pulse shaping
525
perform up conversion

FIG. 7

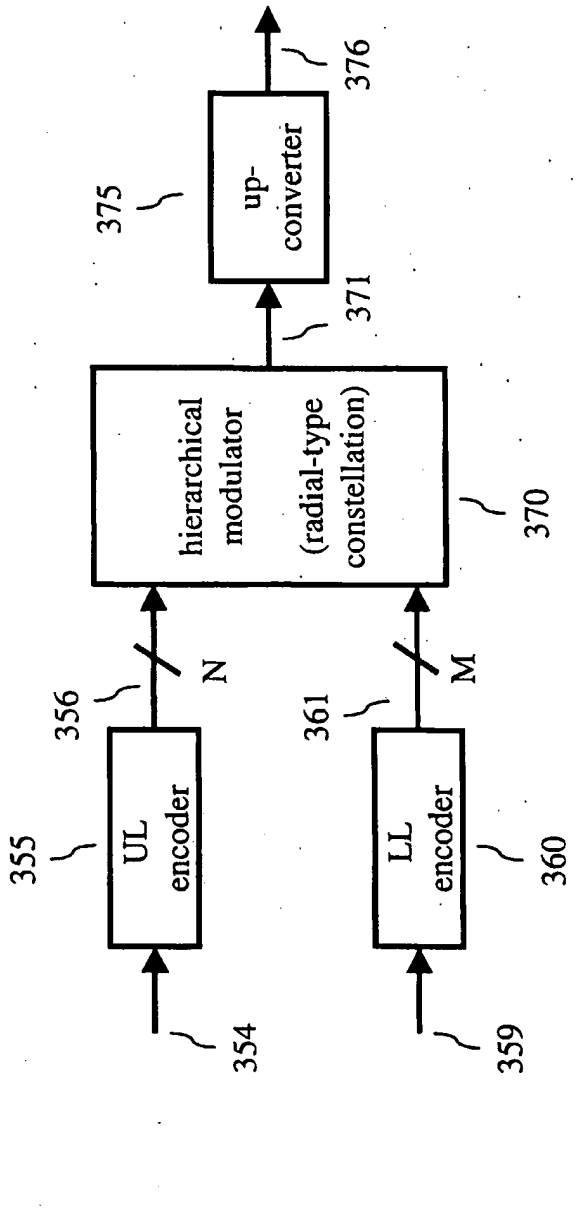

350
354
UL encoder
355
356
N
LL encoder
359
360
361
M
hierarchical modulator (radial-type constellation)
370
371
up-converter
375
376

FIG. 8

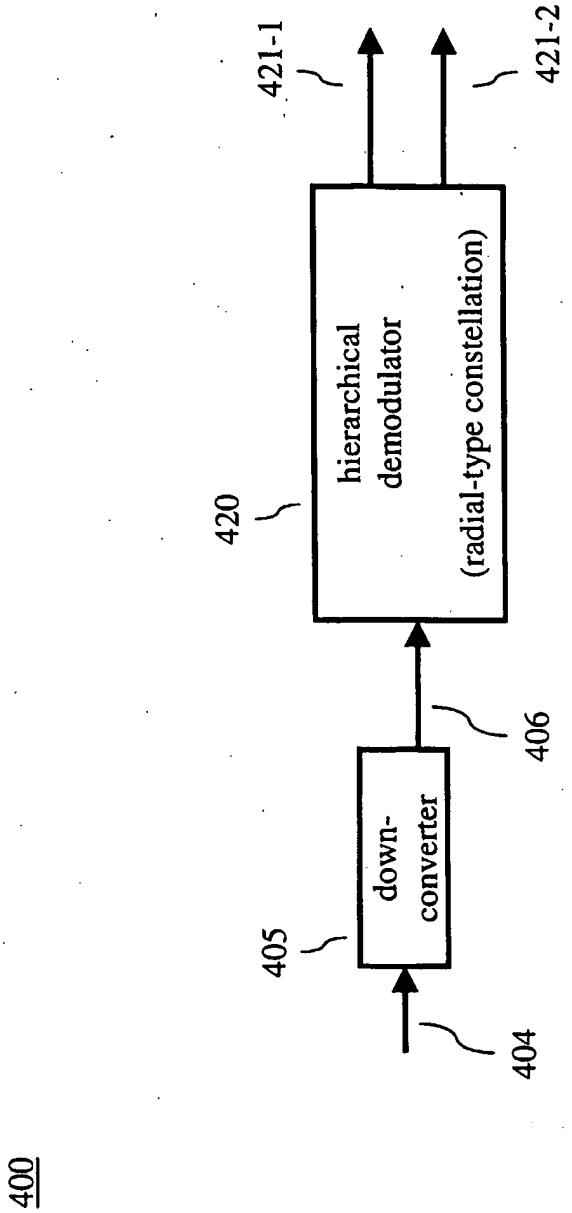

400
404
405
down-converter
406
420
hierarchical demodulator (radial-type constellation)
421-1
421-2

FIG. 9

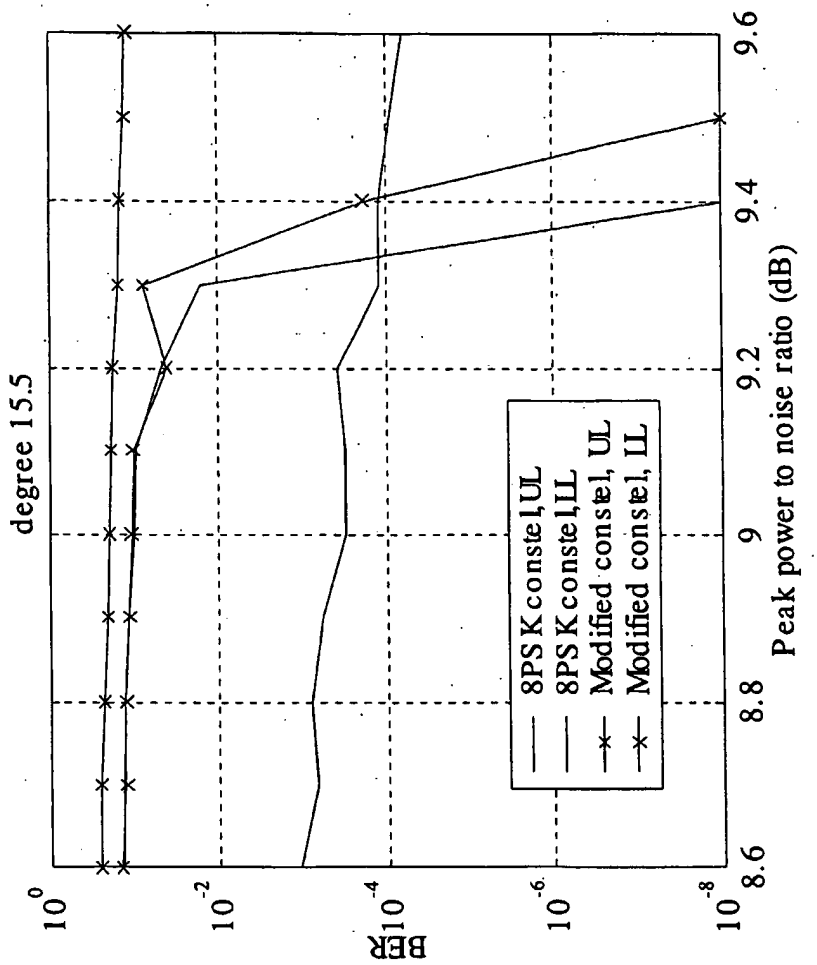

degree 15.5
BER
10^{0}
10^{-2}
10^{-4}
10^{-6}
10^{-8}
8.6
8.8
9
9.2
9.4
9.6
Peak power to noise ratio (dB)
8PSK constel, UL
8PSK constel, LL
Modified constel, UL
Modified constel, LL

FIG. 10

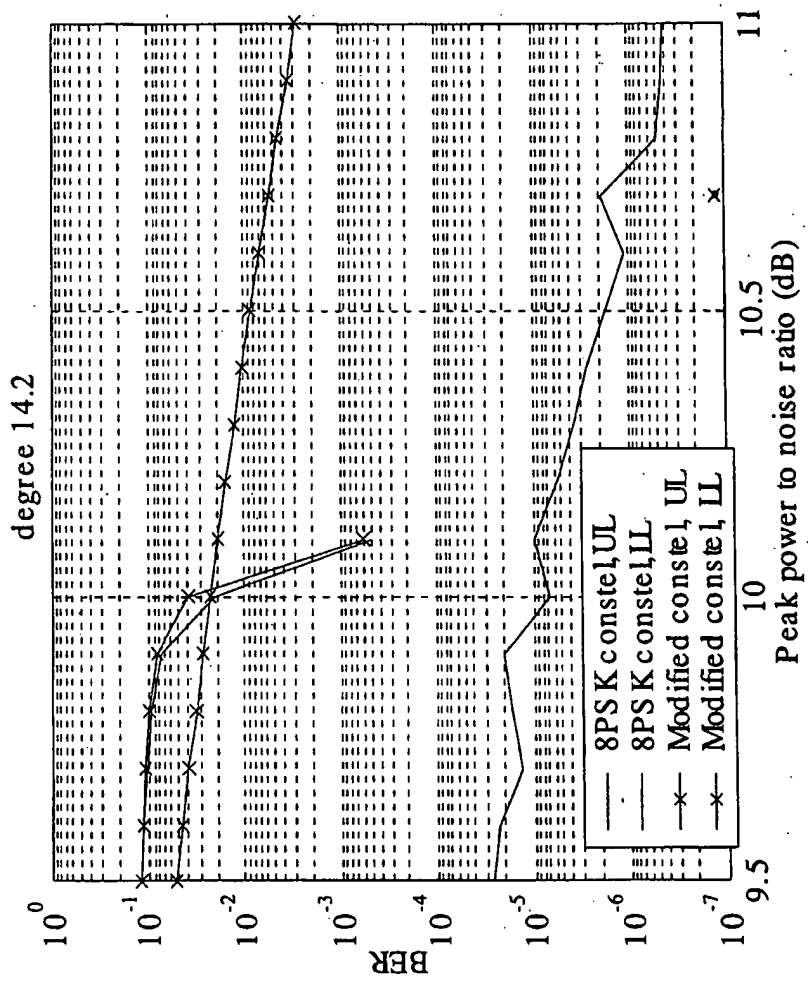
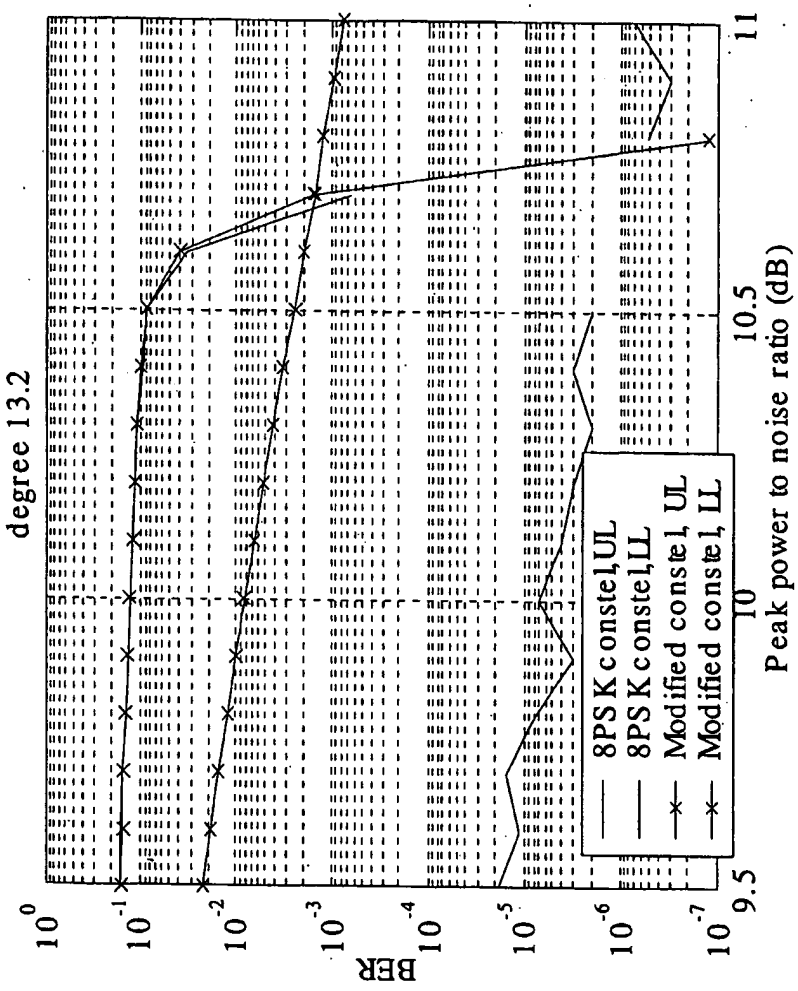

degree 14.2
BER
Peak power to noise ratio (dB)
8PSK const1,UL
8PSK const1,LL
Modified const1, UL
Modified const1, LL

FIG. 11


degree 13.2
BER
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
9.5
10
10.5
11
Peak power to noise ratio (dB)
8PSK constel,UL
8PSK constel,LL
Modified constel, UL
Modified constel, LL

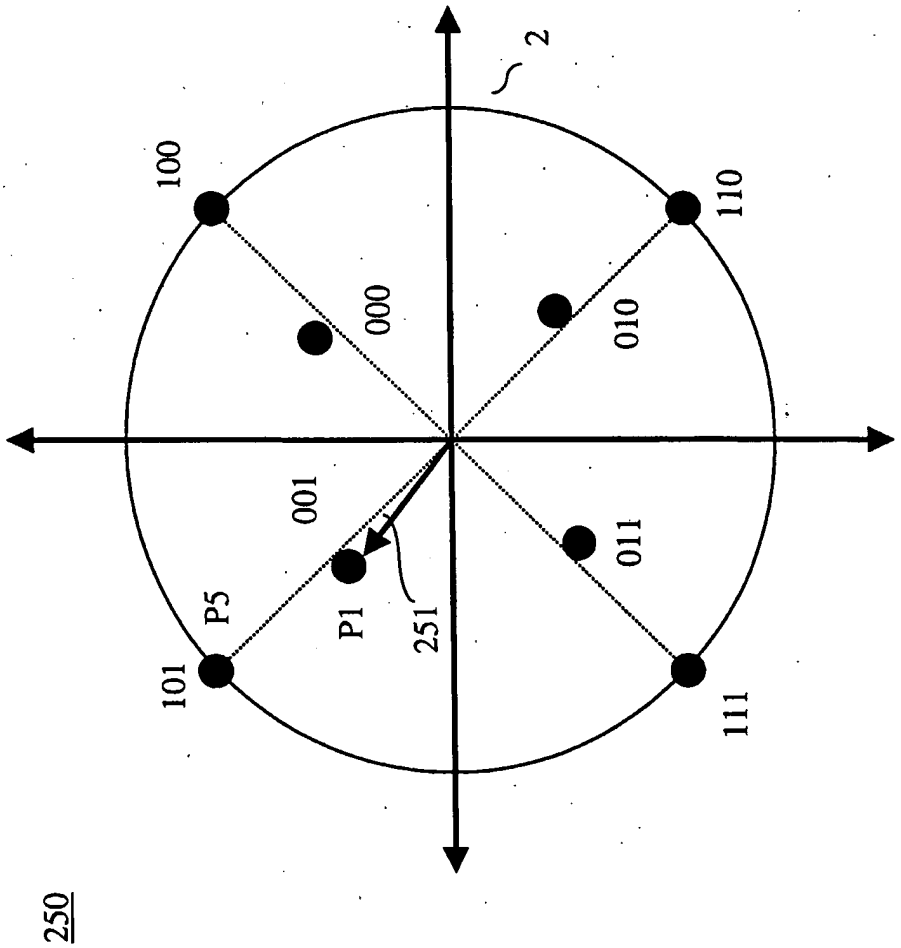


FIG. 12